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Shutdown Plans for NearDet Electronics and DCS

MINDER PROM Swap

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Note:

The drip ceiling over the detector will be extended during the shutdown. While that work is in progress, the detector will be off and inaccessible. This will start roughly one week into the shutdown, and finish about 4 weeks later.

The Calibration group has a set of runs that they need to be taken before shutting down the detector. That activity will be included in an upcoming version.

MINDER PROM Swap

The MINDER Prom Swap will fix the “datatype 7” problem. This is the generation of an incorrect datatype code when an dynode trigger overlaps with the start of SGATE.

The fix involves the removal of old control PROMs, and the insertion of new ones. It can be done in situ, requiring no more than 20 minutes for 2 people per MINDER crate, without full removal of MINDERS. This works out to about 14 hours (x2 people) for the whole detector, but I suspect the it could be done in 2 stints of 5 hours.

Fuse Swap

The majority of bad MENUs removed from the system have a blown 12 V fuse. However, it is now clear that about 25% have other/additional problems. The proposed fix of replacing the existing fuses with resettable ones carries some risk, since resettable fuses are slower acting, and may allow difficult-to-repair or impossible-to-repair damage to the MENUs.

The current proposal is to replace the fuses on 10 crates worth of MENUs. With our typical failure rate, we would expect about 10 failures in 10 weeks in these 10 crates. That should give us sufficient information about the risks and benefits of resettable fuses to either continue with or undo the fuse replacement.

I estimate that pulling 10 crates of MINDERS, and doing the paperwork, will take about 20 minutes per crate, or 3 hours, for 2 people. Reinstallation will take about 1 day of 6-8 hours for two people, including calibrations.

PIN Aux Card Upgrade

The PIN diode signal-to-noise is lower than desired. A fix has been identified to improve this by about a factor of 2. The plan is to upgrade all 11 channels on 5 cards. That will give a High Gain card to go with the existing Low Gain card for each of the two Calorimeter pulser boxes, the Spectrometer pulser box will have only two High Gain cards, and there will be one High Gain spare.

Pulling the cards, with HV off, will require no more than 30 minutes for two people. Simona/Tingjun/Alysia.

MASTER Crate Capacitor Inspection

Two 100mF capacitors were added in parallel to the 6V line on each MASTER crate power harness, to reduce unacceptable transients during SGATE readout. The capacitors have a finite lifetime, but at the temperatures involved, it should be well beyond the lifetime of the experiment. At this point, I recommend a visual inspection of each of the crates.

Bill Luebke: about 30 minutes/crate. Can be spread over several days either between detector shut-down and drip ceiling work, or after drip ceiling work is finished.

Addition of MiniBooNe Trigger

This will be the addition of a fake “TrigPMT-like” signal in the LI crate, to timestamp the approximate arrival of the MiniBooNe spill. This can then be used to allow a much looser soft-

ware trigger in some window around the spill, to have greater sensitivity to NC and nu_e CC interactions.

This will require a signal from the accelerator timing system, a stand alone trigger module to accept this signal and split it to the LI KEEPER trigger and the new Trigger MINDER, the new Trigger MINDER, and some new firmware for the LI crate KEEPER. These all exist. Some other NIM hardware to go in the Timing System NIM crate may be needed, for signal shaping and delays.

Setting up the basic hardware may take less than a day. Timing it in should also take less than a day, as long as MB is running. This will be done by Peter S., and some linear combination of Simona, Hyejoo, and Tingjun.

Geoff says he will be available towards the end of the shutdown to implement the software end of the trigger.

Fan Failure Research and Fix?

Alec proposes that the sporadic fan failure warnings might be fixed with some simple additions to either the RPS boxes or the Fan Tachometer PCB. (E.g., a resistor or capacitor somewhere.)

It is not currently possible to define a schedule, since neither the cause of the problem nor a fix have been identified. Bench studies will be pursued prior to any work in situ. Brian Bock and Bill Luebke will be available to work on this.

588 kHz Noise Work?

This is the problem that causes varying levels of coherent noise, with a spiky pattern occurring at roughly 588 kHz, in about 10 PMTs. The problem is most acute in about 6 PMTs. Swapping Alner Boxes and/or PMT-MINDER cables has improved or worsened the problem in the past, so it is most likely some problem with the grounding or isolation of the analogue signal path from the anode to the MENU input.

No one is currently identified to work on this.